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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/772,253

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Mitsushi Fujiki

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11/29/2005

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EXAMINER

PHAM, THANH V

ART UNIT

PAPER NUMBER

2823

DATE MAILED: 11/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/772,253	Applicant(s) FUJIKI, MITSUSHI	
	Examiner Thanh V. Pham	Art Unit 2823	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 October 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5, 7, 9 and 10 is/are rejected.
- 7) ☒ Claim(s) 6 and 8 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
2. Claims 1-5, 7 and 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Corvasce et al. US 6,300,654 B1 in combination with Ohwaki et al., "Preferred Orientation in Ti Film Sputter-Deposited on SiO₂ Glass: The Role of Water Chemisorption on the Substrate", Jpn. J. Appl. Phys., Vol. 36 (1997) pp L154-L157 (provided by applicant) and Noguchi et al. US 6,716,749 B2.

Re claim 1, the Corvasce et al. reference discloses a method of manufacturing a semiconductor device of prior art, comprising:

forming an insulating film 24 over a semiconductor substrate 11;

forming a lower layer 26 of a lower-electrode conductive film on the insulating film 24;

forming an upper layer 7 of the lower-electrode conductive film on the lower layer 26, and constituting a lower-electrode conductive film by the upper and lower layers;

forming a ferroelectric film 17 of PZT or SBT (re claim 7) on the lower-electrode conductive film 7/26;

forming an upper-electrode conductive film 8 on the ferroelectric film 17; and

forming a ferroelectric capacitor by patterning the upper-electrode conductive film, the ferroelectric film, and the lower-electrode conductive film, fig. 3.

The Corvasce et al. reference does not disclose keeping substrate temperature higher than room temperature and lower than 300 °C while forming a lower layer 26 of a lower-electrode conductive film on the insulating film 24.

The Ohwaki et al. reference discloses a sputtering method (re claim 2) for forming Ti (re claim 3) on glass which improves the orientation of the Ti film in the preferred (002) direction (re claim 4) wherein an orientation with an amount of H₂O to enhance the Ti (002) preferred orientation (re claim 10) providing the temperature at 350 °C.

It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the conditions of Ohwaki et al. to the method of Corvasce et al.'s prior art because the conditions of Ohwaki et al. would provide the ferroelectric capacitor of Corvasce et al. with the Ti (002) preferred orientation for the reliability of the electrode. Further, choice of temperature, partial pressures of elements would have been a matter of routine optimization because temperature and pressure are known to mutual affect each other and affect device properties and would depend on the desired device density on the finished wafer and the desired device characteristics. One of ordinary skill in the art would have been led to the recited temperature of higher than room temperature and lower than 300 °C while forming a Ti lower layer through routine experimentation to achieve desired deposition and reaction rates.

Re claim 5, Corvasce et al. reference discloses the upper layer of the lower-electrode conductive film is a single-layer film made of platinum, col. 3, line 64.

Re claim 9, the combination does not disclose the improvement of the insulating film before forming further the device. The Noguchi et al. reference discloses in col. 21, lines 10-13, quality of the insulating film is improved by exposed a surface of the insulating film to NH_3 plasma. It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the process of the combination with NH_3 plasma nitridation before the lower layer of the lower-electrode conductive film is formed because the plasma nitridation would improve the surface of the insulating film as taught by Noguchi et al.

Allowable Subject Matter

3. Claims 6 and 8 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

(Re claim 6, an orientation direction of the upper layer of the lower-electrode conductive film is a (222) direction. Re claim 8, an orientation direction of the ferroelectric film is a (111) direction.)

Response to Arguments

4. Applicant's arguments filed 10/31/2005 have been fully considered but they are not persuasive.

5. Applicants argue, in the second paragraph on page 4 of the Remark, that not all of the claimed limitations are met by the cited combination of references; however, applicant has not pointed to the limitations alleged to be missing or not suggested by the combination of references relied on.

6. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

7. In response to applicant's argument that the recited temperatures range produces unexpected results by pointing to fig. 2. Showing of fig. 2 ~~does~~^{is} not commensurate in scope with the claim because the fig. 2 does not show the amount of the lower electrode conductive film in a (002) direction obtained at the temperature greater than 250 °C.

8. In response to applicant's argument that "there is a direct teaching by Ohwaki et al. to maintain a minimum temperature of 350 °C while forming the lower electrode conductive film" (emphasized by applicants). The examiner does not agree. Ohwaki et al. teach three conditions to form the lower electrode conductive film in which the substrate is "heated to 350 °C" (first 5 lines on col. 2, page L154) or "the adsorption state of water on the SiO₂ surface at 350 °C is thought to be the key to determining the texture of the deposited Ti film" (next to last paragraph of col. 2, page L 155). The Ohwaki et al. reference does not limit the temperature as alleged.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanh V. Pham whose telephone number is 571-272-1866. The examiner can normally be reached on M-T (6:30-5:00).


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mathew Smith can be reached on 571-272-1907. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2823

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Wf

11/17/2005


George Fourson
Primary Examiner